

CLAIMS

1. A liquid sensor in which a container is filled with an electrically conductive liquid, a part of an electrode having a surface formed with a dielectric film is brought into contact with the conductive liquid, a change in a contact area of the electrode with the conductive liquid with movement of a surface of the conductive liquid is measured from a change in a capacitance between the electrode and the conductive liquid, and a change in a tilt angle of the electrode to the liquid surface or an acceleration applied to the container is detected from a measured value, characterized in that a silicon oxide film is used as the dielectric film.
- 15 2. A capacitance type liquid sensor characterized by a cylindrical closed container (6) made from an electrically insulating material and having two sides (2, 3) parallel to each other, the sides having respective openings (13, 14) formed therein, plate-shaped main electrodes (4, 5) each having at least one side formed with a silicon oxide film, the main electrodes being in abutment with said sides while the silicon oxide films face an inside of the container, thereby closing the openings, and a sealing agent (28) interposed in a gap between the main electrodes and said sides for fluid tightness respectively, and 20 in that the conductive liquid (7) filling the container has an amount corresponding to substantially one half of a content volume of the container, and further characterized by an auxiliary electrode (8) provided in the container to be brought into

electrical contact with the conductive liquid.

3. A capacitance type liquid sensor characterized by a cylindrical container (6) made from an electrically insulator and having two sides (2, 3) parallel to each other and upper and lower openings (9, 10) closed by lids (11, 12) respectively, said sides having vertically extending rectangular openings (13, 14) formed in the sides, notches (19, 20) formed by cutting out corners (17, 18) located outside the container with respect to all end faces of the openings so that plate-shaped members are capable of being fitted in the notches, plate-shaped electrodes (4, 5) having at least one sides formed with silicon oxide films and fitted in the notches so as to abut against bottoms (23, 24) of the notches with the oxide films facing an inside of the container, a sealing agent (28) provided for fluid tightness in gaps defined between the bottoms of the notches and the plate-shaped electrodes and gaps defined between outer peripheral sides of the plate-shaped electrodes and sides of the notches, an electrically conductive liquid (7) having an amount equal to substantially one-half of an inside volume of the container and filling the container, and an auxiliary electrode bar (8) made from a metal and extending through substantially a central part of the upper lid (11) so that a distal end thereof is immersed sufficiently deep in the conductive liquid.

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4. The capacitance type liquid sensor according to claim 2, characterized in that the cylindrical container is formed into a square cylindrical shape and has two pairs of parallel sides,

the four parallel sides having openings closed by plate-shaped main electrodes (4, 4a, 5, 5a) having silicon oxide films respectively.

5 5. The capacitance type liquid sensor according to claim 3, characterized in that the cylindrical container is formed into a square cylindrical shape and has two pairs of parallel sides, the four parallel sides having openings closed by plate-shaped main electrodes (4, 4a, 5, 5a) having silicon oxide films
10 respectively.

6. The capacitance type liquid sensor according to claim 3 or 5, characterized in that the bottoms (23, 24) of the notches are formed with grooves (29) respectively and the sealing agent (28) fills for fluid tightness spaces defined between the grooves and the plate-shaped main electrodes respectively.
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7. The capacitance type liquid sensor according to claim 3 or 5, characterized in that an entire or a part of the lower lid (12) is made from an electrically conductive material to serve as an auxiliary electrode, instead of the metal auxiliary electrode (8).
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8. The capacitance type liquid sensor according to claim 25 2 to 5, characterized in that an entire side of the plate-shaped main electrode facing an outside of the container is covered with a sealing agent.

9. The capacitance type liquid sensor according to claim 2 to 5, characterized in that a glass having a low melting point is used as the sealing agent.

5 10. A capacitance type liquid sensor characterized by a closed container (48), an electrically conductive liquid (42) having an amount equal to substantially one-half of an inside volume of the container and filling the container, a pair of lead terminals (44, 45) extending through one of ends of the container
10 and fixed to the container so as to be electrically insulated from the container, main electrodes (46, 47) having surfaces formed with silicon oxide films and mounted on distal ends of the lead terminals, respectively, the main electrodes being provided so that parts of the main electrodes are located on a
15 liquid surface of the conductive liquid when the container is stationary, and an auxiliary electrode electrically conductively brought into contact with the conductive liquid.

20 11. The capacitance type liquid sensor according to claim 10, characterized in that two pairs of the lead terminals extend through said one end of the container and are fixed to the container, instead of one pair, the main electrodes are mounted on distal ends of the lead terminals respectively, and imaginary lines connecting centers of the respective paired main electrodes
25 intersect perpendicularly to each other.

12. The capacitance type liquid sensor according to claim 10 or 11, characterized in that the main electrodes are formed

into a shape of a short strip and two main electrode sides of each pair are opposed to each other so that imaginary lines connecting centers of the respective paired main electrodes are perpendicular to the sides of the respective paired main
5 electrodes.

13. The capacitance type liquid sensor according to claim
10 or 11, characterized in that the main electrodes are formed
into a shape of a short strip and are disposed radially so that
10 angles made by the main electrode sides adjacent to each other
are equal to each other.

14. The capacitance type liquid sensor according to claim
10 or 11, characterized in that the auxiliary electrode is the
15 closed container made from an electrically conductive material.

15. The capacitance type liquid sensor according to claim
10 or 11, characterized in that the auxiliary electrode extends
through one of ends of the container and is fixed to the container.
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16. The capacitance type liquid sensor according to any
one of claims 2 to 5, 10 and 11, characterized in that each main
electrode is made from any one of single crystals silicon, amorphous
silicon, polycrystalline silicon.
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17. The capacitance type liquid sensor according to any
one of claims 2 to 5, 10 and 11, characterized in that the conductive
liquid is made from any one or a combination of two or more of

an alcohol group including methyl alcohol, ethyl alcohol and isopropyl alcohol, a ketone group including acetone and methyl ethyl ketone, an ether group including diethylene glycol mono-butyl ether and the like with addition of an electrolyte
5 including lithium nitrate, potassium iodide or the like.

18. The capacitance type liquid sensor according to any one of claims 2 to 5, 10 and 11, characterized in that an inert gas is contained in the closed container.